

**DATA PROCESSING APPARATUS, IMAGE PROCESSING
APPARATUS, AND METHOD THEREFOR**

ABSTRACT OF THE INVENTION

It is one object of the invention to optimize watermark data that indicate additional
5 information, such as copyright information, in accordance with the contents of object
data, and, for example, to embed the watermark data in image data.

An image divider 200 divides image data V_i into image blocks I_{ij} , and corresponds a
selected basic pattern P_{hij} with each of the image blocks I_{ij} . Orthogonal transformation
10 units 24 and 202 generate DFT coefficients I'_{ij} and P'_{hij} , and power element calculators
208 and 264 generate power elements I''_{ij} and P''_{hij} . A basic pattern adjustment unit 26
adjusts the coefficient of P'_{hij} to generate P'_{hij1} to P'_{hijn} . A watermark pattern generator
28 calculates variations before and after P'_{hij1} to P'_{hijn} are embedded in I''_{ij} , and selects,
from P'_{hij1} to P'_{hijn} , P'''_{hij1} to P'''_{hijl} that provide variations equal to or smaller than the
15 threshold value e . Then, the watermark pattern generator 28 selects, as a watermark
pattern P'_{ij} , the pattern that is most easily detectable, and for embedding, a pattern
embedding unit 204 adds P'_{ij} to I'_{ij} .